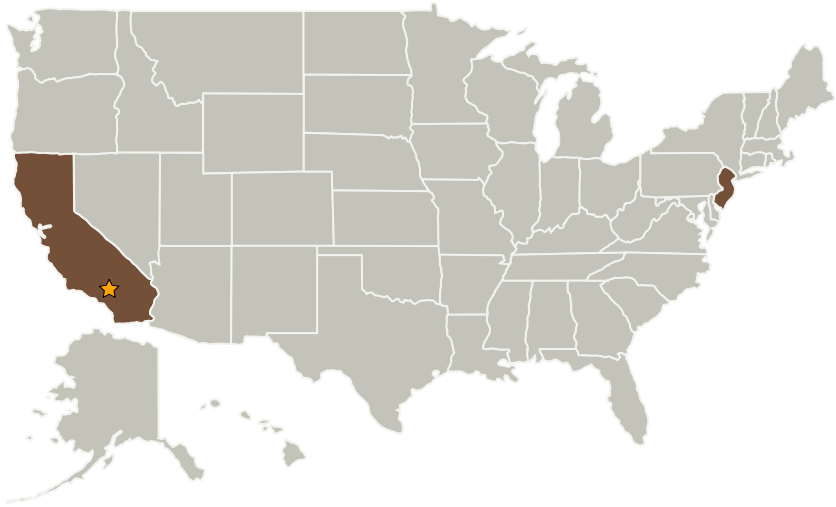
Distributed Flight Controls for UAVs, Phase I

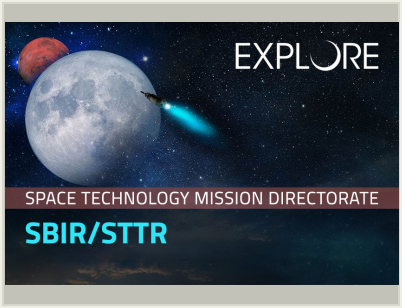
Completed Technology Project (2005 - 2005)

Project Introduction

Two novel flight control actuation concepts for UAV applications are proposed for research and development, both of which incorporate shape memory alloy (SMA) wires as prime movers. These actuators promise considerable savings in weight, power, and volume over existing electomechanical and hydraulic systems. Incorporation of these actuators within lifting surface structure, or as trailing edge control devices, would greatly simplify the actuation systems of these aircraft, thereby permitting greater payload fraction, increased range, enhanced robustness, and/or smaller vehicle size, and thus reduce both operational and fixed system costs. Choice between the two actuation concepts for a particular installation represents a tradeoff in actuation system bandwidth and power availability, and thus the same vehicle may include both systems depending upon the particular functional requirements. These actuators represent a derivative technology from a previous Army SBIR Phase I/II effort directed at providing in-flight helicopter blade tracking using actively controlled trailing edge tabs, and thus have been designed to have low mass and low power requirements from their inception. Since they lack any physical hinge joints, they may be embedded directly within aircraft lifting surfaces, eliminating interference drag associated with control deflection.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Armstrong Flight Research Center(AFRC)	Lead Organization	NASA Center	Edwards, California
Continuum Dynamics, Inc.	Supporting Organization	Industry	Ewing, New Jersey

Primary U.S. Work Locations	
California	New Jersey

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Robert Mckillip

Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.3 Aeroelasticity